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Longitudinal assessment of elite swimmers performance leading to 2008 Beijing Olympic Games

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OBJECTIVE The aim of this research was to track and analyze the stability of 400-m freestyle performance throughout elite swimmers preparation to the 2008 Beijing Olympic Games.

METHODS One hundred and six male swimmers were analyzed for five consecutive seasons (2003 to 2008). All swimmers were in the top 150 of 400-m Freestyle 07-08 FINA World Ranking. Swimming performance was collected using best personal time in 400-m Freestyle event, on official competitions in each season, on a short course pool. An exploratory data analysis was performed (Shapiro-Wilk). Longitudinal assessment was made by: (i) mean stability; (ii) normative stability. For mean stability quartiles, means plus standard deviations were computed for each season. Data variation was analyzed with ANOVA repeated measures followed by a post-hoc test (Bonferroni). Normative stability was analyzed with self-correlation (Pearson) between the performances throughout the five seasons. Cohen's Kappa (K) was computed in Longitudinal Data Analysis software (v. 3.2, Dallas, USA) with a 95% confidence interval.

RESULTS There was a trend for a performance improvement throughout the swimmer's preparation. Significant variations in the mean swimming performance were verified [$F(1,11) = 171305.9$; $p < 0.01$]. Post-hoc test revealed significant variations between all swimming seasons analyzed ($p < 0.01$) except for the pair wise comparison between third and fourth seasons. Self-correlation values ranged between moderate and high throughout the swimmer's preparation. Stability becomes high in the fourth season ($r = 0.723$). The K value, was low ($K = 0.331 \pm 0.043$).

DISCUSSION & CONCLUSION The prediction of final swimmer's performance, based on initial season's performance is moderate. The change from third to fourth season can be a milestone were the ability to predict the swimmer's final performance level increases strongly.

KEYWORDS Swimming, Performance, Prediction

Hormonal and metabolic evaluation of 12 weeks swimming training in females

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OBJECTIVE The biological safety margin in people regularly practising physical exercises is greater, which in the context of health may be of particular importance. Therefore, the aim of our study was to evaluate the selected metabolic and hormonal indices in female participants of swimming training involving aerobic components.

METHODS Two groups were examined: the experimental group ($n=19$, 21.0 ± 1.3 years, BMI 22 ± 2) and the control group ($n=19$, 20.0 ± 1.1 years, BMI 22 ± 2). The swimming training covered a period of 12 weeks, 3 times per week for 60 minutes. Blood samples were collected before the training (cycle I), following 6 weeks (cycle II) and 12 weeks of training (cycle III), before and after each swimming session, in order to determine the level of lactic acid, glucose, free fatty acids, growth hormone, leptin, insulin, cortisol and testosterone. Body mass, fat and fat free mass were measured in resting conditions using bioelectrical impedance. Heart rate was recorded during an hour-long training. Endurance level was evaluated using the Cooper test in water.

RESULTS In each testing cycle physical exercise caused significant ($P < 0.05$) increase in lactic acid and free fatty acid levels and decrease in glucose levels. Similar significant ($P < 0.05$) training-induced increases in growth hormone level and decreases in insulin and leptin levels were observed. In the case of cortisol and testosterone the changes were insignificant. The mass of adipose tissue (25-26%) remained at a similar level throughout the experiment. In the